

now recognised that dosage is not to be measured by bulk. How far we have travelled from the older doctrine may be appreciated on reading such statements as the following:—"in very dilute solutions the salt molecules are supposed to be held in solution almost entirely in a state of dissociation, as *ions*" (p. 319); and "It must be confessed, however, that minute quantities . . . apparently too insignificant to deserve mention, may ultimately turn out to have a real importance" (p. 327).

The selection and employment of baths in chronic disorders belong mainly to the spa physician. The present volume contains much suggestive material, but there is still room for a good practical treatise on the use of baths by a practising balneologist. The need for an "after-cure" in all serious cases is here very properly insisted upon. It may be safely affirmed that the failure of health-resort treatment is due in most cases either to the neglect of the "after-cure" or else to the common error of indulgence in a too prolonged course of baths, or in baths at too high a temperature. The valuable place of *sub-thermal* baths, given at temperatures below blood heat, has never been sufficiently emphasised as a mode of treatment at all the spas.

The discussion of the indications for climatic and spa treatment in the closing chapters should be of service to all those who have to do with the selection of a health resort.

THE CORAL PORITES.

Catalogue of the Madreporarian Corals in the British Museum (Natural History). Vol. vi., The Family Poritidæ, ii., The Genus *Porites*, Part ii. By H. M. Bernard. Pp. vi+173. (London: Printed by Order of the Trustees of the British Museum, 1906.) Price 20s.

WITH the publication of the second volume of the Poritidæ it may be said that Mr. Bernard's system of cataloguing the corals in the British Museum has been given a fair trial. A great deal of skilled labour has been devoted to this work, and a great deal of money has been spent upon it. It is therefore right that the merits of the system itself should be re-considered in the light of the results obtained.

That the catalogue is of some value no one would be disposed to deny. We have now, not only a record of the existence of a number of specimens of corals in the British Museum, but a careful, detailed account of their form of growth and skeletal characters. For those whose business it is to catalogue or study certain genera of corals, it is now possible to ascertain, without making a special journey to London for the purpose, that their specimens are similar to others in the possession of the British Museum. Students of coral structure have, moreover, the advantage of considering the general remarks on the variation in the mode of growth, of the arrangement of the septa, pali, &c., made by an authority who has had a very large number of specimens to examine.

But Mr. Bernard has abandoned the time-honoured

plan of arranging his specimens in groups of species and has adopted the system of ticketing each specimen with the name of the locality in which it was found and a meaningless number. Thus the specimen in the Paris Museum, which has for nearly a hundred years been known as the type of *Porites clavaria*, Lamarck, is recorded in the British Museum catalogue as *Porites americana incertae sedis secunda*.

It is true that the attempt to apply the Linnean system to the Madreporaria and other orders of Coelenterata is beset with many very great difficulties. Everyone who has worked at the systematic zoology of these animals has met these difficulties, and has probably realised that in the present state of knowledge his solution of them is crude and unsatisfactory. But we are still in the early period of the history of coral morphology, and until our knowledge of the anatomy of the coral polyps, of their tentacles, of their mesenteries, of their mesenteric filaments, and of other features of their anatomy is considerably extended, we are not in a position to conclude that the Linnean system is not applicable to them. The advantage of using the Linnean system, however, even in the present state of knowledge, is that it enables the naturalist who has made a special study of a genus to express his opinion, by the arrangement of the specimens into specific groups, of the relations he believes they bear to one another. His opinion may not be sound, it may even prove to be misleading, but the stimulus it gives him to careful and accurate observation is the very soul of his work, and alone gives life to systematic zoology.

In Mr. Bernard's catalogues we find simply a bald statement of facts. There are descriptions and figures of specimens, there are tables and lists, but there is not one word concerning the thoughts or opinions of the man who has devoted so considerable a part of a lifetime to the collection of these facts. It is like a quantity surveyor's estimate of bricks and stones without an architect's plan of the building they are to construct. We do not get in this system what we might expect to get, the benefit of the author's long experience, and, on the other hand, for those who would follow him in the systematic zoology of corals his volumes offer nothing but discouragement.

The time has come when a new line of research should be undertaken, namely, a systematic study of the soft parts of a large number of specimens of some one genus such as *Porites*, and a comparison made of the relation of the anatomy of the zooids to the different forms of skeletal growth. In this investigation some of Mr. Bernard's tables may prove useful, but the naturalist will have to go through a great deal of the work again in order to make the record valuable for systematic purposes. Such a study may achieve a great deal in clearing up the difficulty of distinguishing between characters that are intrinsic and transmitted by heredity to successive generations and characters that are due to the immediate influence of the environment. It may indicate to us the characters that are of value and those that are not of value for purposes of classification.

cation. In the meantime, it would be a serious mistake if those in charge of collections of corals were contented to adopt the *non possumus* attitude of Mr. Bernard and make no serious attempt to arrange their specimens in systematic groups.

One of the most important observations recorded in this volume is that there seems to be a fairly constant difference between the Atlantic and Indo-Pacific specimens of *Porites*. This difference lies simply in "the fact that the trabecular, horizontal and synapticular elements which compose the skeleton are thicker and coarser in the Atlantic and West Indian forms than they are in those of the Indo-Pacific." This difference is one which may prove to be of great importance in the re-arrangement of the species that will be made in the future, and although there are some exceptions (p. 19) that may require special investigation, it will be of interest to inquire how far a difference in the anatomical character of the polyps coincides with this difference in a skeletal character.

Mr. Bernard devotes one chapter of his introduction to what he terms "metameric" growth in *Porites*. This principle of growth is well known to workers in the various groups of corals, but it is not one to which zoologists have hitherto applied the expression "metamerism." The metameric segmentation of a living animal body such as we see, for example, in the developing larva of a *Polygordius* is one thing, a linear series of gemmations in which the last of the series alone survives is another. To confound the two by using the same word for them will certainly not assist in the elucidation of the problems of coral growth. The phenomena of "overgrowth" in corals, as this process may more conveniently be called, are not fully understood, and may be due to several natural and circumstantial causes, but none of them seems to be due to any process that is at all comparable with the metameric segmentation of a worm or of an arthropod.

Although it has been necessary to express freely an opinion as to the value of the method employed in this volume, we may express our admiration of the careful descriptive account of each specimen in the catalogue and of the excellence of the plates.

S. J. H.

REALISTIC SCHOOL MATHEMATICS.

A School Course of Mathematics. By David Mair. Pp. viii+379. (Oxford: The Clarendon Press, 1907.) Price 3s. 6d.

FOR some years past the Civil Service Commissioners have systematically set themselves the task of framing their examination questions so as to make them of practical interest instead of merely being a test of a candidate's capability in abstract mathematics.

Mr. Mair, in the present book, has given a most useful and interesting collection of such of these examples as he considers should be within the range and powers of boys while still at school. These questions are given in sets at the end of the various

chapters, which are devoted to the discussion of a few typical questions. These typical questions are discussed with variations and from different points of view, the discussion being thrown into the form of questions by the teacher, and answers supposed to be given by the pupil.

It is somewhat difficult to realise how these discussions are intended to be made use of unless they are meant only as typical, to be taken merely as suggestions, and not to be followed in detail; it would certainly not do for the class to have the book open during the discussion, and it would take too long for the class to write down the questions to which they are asked to give an answer, and yet in many cases the questions are somewhat difficult to answer unless the pupils can have them in writing. Moreover, in some cases the work involved in the discussion before the pupil has satisfactorily arrived at the generalisation which the teacher is striving to bring him to is so lengthy that it could not be completed in a single sitting, and consequently the continuity of thought required would be seriously interrupted. This difficulty seems not to have been contemplated by the author.

Moreover, he does not seem to have sufficiently realised that the young pupils for whom he is catering in the earlier chapters are incapable of the sustained thought and the considerable efforts of memory and chains of reasoning which he requires, and, most serious defect of all, even if the pupils are brought to perceive and retain the mathematical truths thus presented to them, these truths are so detached from each other and are so various in kind that they do not form in any sense a *mathematical course*.

In spite of this, however, the book will be of very great use. Thus, in some schools it is already being used with the upper army classes for the sake of the excellent examples with which it is crowded, the question and answer part being for the most part ignored with these classes, and, with regard to the text, if the teacher can find time to go carefully through the book, he will find a great deal of help given him as to the best way of bringing home some mathematical facts to boys in a more realistic and vivid manner than he might otherwise be able to do. For example, the author has a special way of his own for introducing boys to logarithms. This method is very carefully worked out, and is particularly worthy of study. Possibly each teacher will elaborate some modification of his own which he prefers, but he certainly should very carefully consider the author's method, which is most ingenious and well worked out so far as he goes, though there is a gap at the end which he has jumped. The author's treatment of questions in solid geometry also is good, giving them a reality and vividness which will make this part most valuable as an introduction or as a companion to the theorems of the eleventh book of Euclid or its modern equivalent.

The impression left on the reviewer's mind is that the book in no way supersedes the regular class books on the various subjects, but that it may be a most valuable adjunct to them in two ways, first, by sug-